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Serial No. 10/556,834
Date of Office Action: 02/20/09
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LISTING AND AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 1. (original) A method for simulating film grain comprising the steps of:
2 receiving image information representative of an image from which film grain has been at
3 least attenuated;
4 receiving film grain information that includes at least one parameter among a set of
5 possible parameters specifying different attributes of the film grain previously in the image;
6 selecting a model for simulating grain;
7 simulating the film grain in accordance with the selected model and the at least one
8 parameter; and
9 merging the simulated film grain into the image.

1 2. (Previously presented) The method according to claim 1 wherein the set of
2 parameters includes a plurality of correlation parameters and a plurality of intensity-independent
3 parameters.

1 3. (original) The method according to claim 2 wherein at least one correlation
2 parameter defines a spatial correlation in a perceived pattern of film grain.

1 4. (original) The method according to claim 2 wherein at least one correlation
2 parameter defines a correlation between color layers.

1 5. (original) The method according to claim 2 wherein at least one correlation
2 parameter defines a temporal correlation resulting from previous processing the image sequence.

1 6. (original) The method according to claim 2 wherein at least one intensity-
2 independent parameters defines an aspect ratio of the film grain.

1 7. (original) The method according to claim 1 wherein at least one parameter defines
2 intensity of a random component of the film grain.

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1 8. (original) The method according to claim 2 wherein at least one of the intensity-
2 independent parameters defines a color space and blending mode operation used to merge the
3 simulated film grain with the image.

1 9. (previously presented) The method according to claim 1 wherein a message
2 containing the film grain information is transmitted out-of band with the image representative
3 information.

1 10. (previously presented) The method according to claim 1 wherein a message
2 containing the film grain information is transmitted in band with the image representative
3 information.

1 11. (original) The method in accordance with claim 2 where the set of parameters are
2 computed in accordance with a second order auto regression representation of the spatial
3 correlation and a first order regression representation of the cross-color and temporal
4 correlations.

1 12. (original) The method according to claim 3 wherein the at least one parameter
2 describing the spatial pattern of the grain is established in accordance with a spatial convolution
3 model.

1 13. (original) The method according to claim 3 wherein the at least one parameter
2 describing the spatial pattern of the grain is obtained from cut frequencies of a filter in the
3 Fourier domain.

1 14. (original) The method according to claim 1 wherein the set of selecting the model
2 further comprises the step of selecting an additive grain model.

1 15. (original) The method according to claim 1 wherein the set of selecting the model
2 further comprises the step of selecting a multiplicative grain model.

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1 16. (original) The method according to claim 1 wherein the step of selecting the
2 model further comprises the step of selecting a model that simulates the film grain by convolving
3 a set of random numbers by a linear, time-invariant, digital-filter h defined in the form of:

$$h = (h_0, h_1, h_2, h_3, \dots h_n)$$

4
5 wherein the set of parameters includes filter coefficients.

1 17. (original) The method according to claim 1 wherein the step of selecting the
2 model further comprises the step of multiplying in the frequency domain by a Fourier Transform
3 of an impulse response H and a Fourier Transform set of random numbers to yield a simulated
4 grain result $Y(u)$ in accordance with the relationship

$$Y(u) = X(u) \cdot H(u)$$

1 18. (original) Apparatus for simulating film grain, comprising :
2 first means for: (1) receiving image information representing an image from which film
3 grain has been substantially attenuated; (2) receiving film grain information that includes at least
4 one parameter among a set of possible parameters specifying different attributes of the film grain;
5 (3) selecting a model for simulating grain; and (4) simulating the film grain in accordance with
6 the selected model and the at least one parameter; and
7 second means for merging the simulated film grain with the image .

1 19. (original) The apparatus according to claim 18 wherein the model selected by the
2 first means comprises an additive grain model.

1 20. (original) The apparatus according to claim 18 wherein the model selected by
2 the first means comprises a multiplicative grain model.

1 21. (original) The apparatus according to claim 18 wherein the model selected by the
2 first means simulates the film grain by convolving a set of random numbers x by a linear, time-
3 invariant, digital-filter h defined in the form of:

$$h = (h_0, h_1, h_2, h_3, \dots h_n)$$

4
5 wherein the set of parameters includes filter coefficients.

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1 22. (original) The apparatus according to claim 18 wherein the model selected by
2 the first means simulates film grain by multiplying in the frequency domain by a Fourier
3 Transform of an impulse response H and a Fourier Transform set of random numbers to yield a
4 simulated grain result Y(u) in accordance with the relationship:

1
2 23. (Previously presented) A method for simulating film grain comprising the steps
3 of: receiving image information representative of an image;
4 receiving film grain information that includes at least one parameter specifying at least
5 one film grain attribute; and
6 simulating the film grain in accordance with the at least one parameter.

1 Cancel claim 24.

1 25. (Previously presented) The method according to claim 1 wherein the step of
2 receiving film grain information includes the step of receiving a plurality of parameters each
3 indicative of a film grain attribute.

1 26. (Currently amended) ~~An method~~ for communicating image information and film
2 grain information ~~by comprising the step of~~ transmitting the film grain information out-of band
3 with respect to the image representative information.

1 27. (Previously presented) ~~An method~~ encoder for communicating image
2 information and film grain information ~~by comprising the step of~~ transmitting the film grain
3 information in-band with respect to the image representative information.